Blood Pressure and Other Correlates of Left Atrium Volume in the Population

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LA enlargement might be an independent predictor of CV death, stroke, congestive heart failure and atrial fibrillation. Information on correlates of LA remodeling beyond anthropometric characteristics and left ventricular size is scarce.

Objectives

In unselected general population:

✓ we measured LA size
✓ we explored the determinants of LA size
✓ we quantified the prevalence of LA enlargement

Statistics

Using stepwise multiple regression, we searched for possible covariates of the LA size (LA volume/BSA) with the P-value for independent variables to enter and stay in the model set at 0.10. We considered as covariates sex, age, waist circumference, HR, SBP, DBP, pulse pressure, LVMi and PWV. We generated a healthy reference group excluding participants with HT, diabetes, obesity or abdominal obesity, LVH, valve disease and AF to obtain reference values of LA enlargement in our population.

Design and Methods

649 randomly recruited participants from a European population (the FLEMENGHO study) underwent standardized and validated questionnaires, anthropometrics, BP measurements and biochemical measurements.

Pulse wave velocity was recorded by means of applanation tonometry and SphygmoCor system (AtCor Medical, West Ryde, Australia).

Echocardiographic examinations were performed by a single observer and by means of Vivid 7 ultrasound scanner (GE Vingmed, Horten, Norway). All recordings were stored in a digital format for off-line reading (EchoPac, GE). LA volume was measured using the prolate-ellipsoid method and indexed to the body surface area (LAVI=LA volume/BSA).

Results

The 649 participants included 329 (50.7%) women, and 271 (41.8%) hypertensive patients of whom 24.8% were on antihypertensive drug treatment. Table 1 shows the clinical and echocardiographic characteristics of the participants and the health reference group. The mean age (±SD) of participants and health group was 51.6±15.0 years and 44.0±14.0 years, respectively. Mean LAVI was 22.9±6.8 ml/m2 and prevalence of LA enlargement (LAVI>30 ml/m2) 13%. The stepwise multiple regression (Table 2) showed independent and significant correlations between LAVI and the independent covariates age, waist circumference, HR, LVMI, PP, and PWV. The residuals of LA volume and PWV were calculated to remove the effect of age, anthropometric characteristics, HR and PP, and the inverse correlation (r=-0.11, p=0.012) observed in the stepwise multiple regression was confirmed.

Conclusions

LA enlargement is common in general population. LA size increases significantly and independently with PP, a relation that might be explained by diastolic dysfunction associated with hypertension. Furthermore, our findings suggest that in subjects with complain arteries (lower PWV) the capacitance of LA also increases and LA might accommodate more volume at the specific level of pressure.